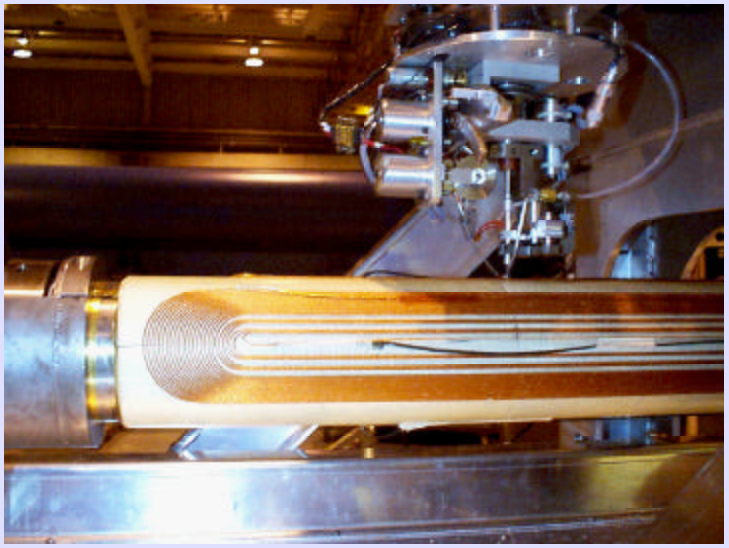
BTev Correctors



- We have looked at 2 possible technical solutions:
  - RHIC style trim quad (performs the same function in RHIC as in BTev)
  - DESY style direct wind (our version of the Fermilab conceptual design)

BTev Correctors

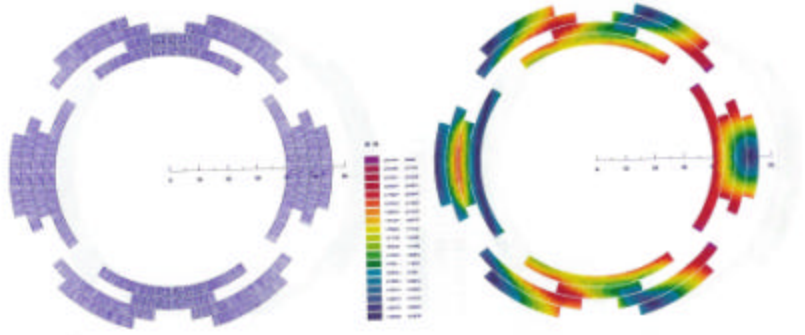


Figure 4-4: NQ/NS coil cross-section (left) and field distribution (right).

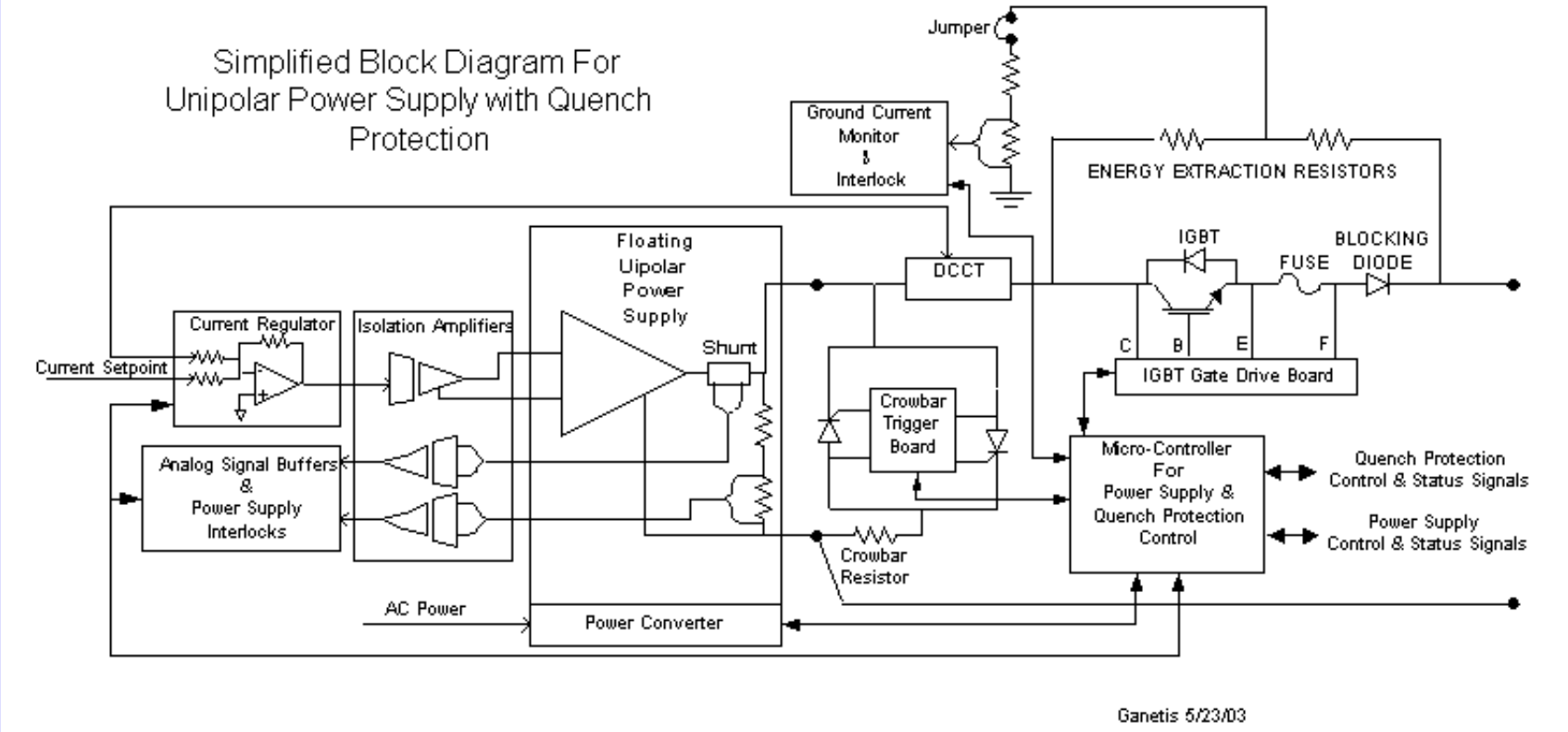
Table 4-7: NQ harmonics at 1" radius (NS=off), nominal current.

MAIN FIELD		0.93930	NORMAL REL. MULTIPOLES (1.D-4):				
b 1:	0.00000	b 2:	10000.00000	b 3:	0.00000		
b 4:	0.00000	b 5:	0.00000	b 6:	0.17997		
b 7:	0.00000	b 8:	0.00000	b 9:	0.00000		
b10:	0.39959	b11:	0.00000	b12:	0.00000		
b13:	0.00000	b14:	0.46534	b15:	0.00000		
b16:	0.00000	b17:	0.00000	b18:	-0.22728		
			SKEW REL. MULTIPOLES (1.D-4):				
a 1:	0.00000	a 2:	0.00000	a 3:	0.00000		
a 4:	0.00000	a 5:	0.00000	a 6:	0.00000		
a 7:	0.00000	a 8:	0.00000	a 9:	0.00000		
a10:	0.00000	a11:	0.00000	a12:	0.00000		
a13:	0.00000	a14:	0.00000	a15:	0.00000		
a16:	0.00000	a17:	0.00000	a18:	0.00000		

The RHIC style trim quad can meet the requirements (just) but Iop is high ~175A with (marginal) margin.

We will show the direct wind solution which looks technically more robust in all cases (Iop ~75A)

BTev Correctors - quench protection



Without the benefit of any calculations but scaling from RHIC dipole correctors we believe that active protection is necessary:

- energy extraction resistors not quench heaters
- 100A supply is relatively straightforward

BTev Correctors - reliability

Similar (2-D), nested, single layer correctors used in RHIC without any failures to date

- ~400 dipoles in 5th year of operation, Iop is ~<20A

Similar multi-layer quadrupoles (4) have operated for 3 years in HERA with abuse (mostly intentional) and have performed well.